# A gyratory crusher


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Abstract of **GB482825**

482,825. Gyratory crushers. I. G. FARBENINDUSTRIE AKT.-GES. Oct. 5, 1936, No. 26985. Convention date, Oct. 5, 1935. [Class 59] A gyratory crusher is provided with a freely swinging crusher head suspended on flexible members such as ropes &c., the head being oscillated by a rotating unbalanced mass. As shown in Fig. 1, a gyratory crushing head a is suspended by wire ropes, chains, &c. b and is gyrated at its upper end around the crushing surface f by the rotation of an unbalanced mass c driven through a shaft d connected to a motor e. The bottom of the head a is weighted by the motor and by a weight g so that the bottom has little or no movement. The unbalanced mass c may be placed at the bottom of the crusher and the motor and weight at the top so that the bottom partakes of the gyratory motion. In Fig. 3, the unbalanced masses c are placed along the shaft which is driven through a flexible coupling h so that the whole of the head partakes of the gyratory motion.


FIG. 1.

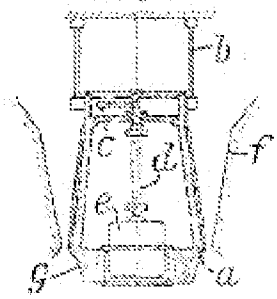
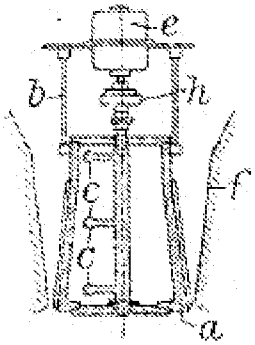



FIG. 3.



# PATENT SPECIFICATION

Convention Date (Germany): Oct. 5, 1935.

Application Date (in United Kingdom): Oct. 5, 1936.

Complete Specification Accepted: April 5, 1938.

482,825

No. 26985/36.

COMPLETE SPECIFICATION

## A Gyratory Crusher

We, I. G. FARBENINDUSTRIE AKTIENGESELLSCHAFT, a Joint Stock Company organised according to the Laws of Germany, of Frankfurt a/Main, Germany, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to a gyratory crusher and more particularly to a gyratory crusher which can oscillate freely in the interior of a crusher bowl.

The invention is based on the observation that when the upper part of the crusher head of a conical crusher, caused to perform circular or substantially circular oscillations by a rapidly rotating unbalanced body, is suspended from a rigid body by flexible means which have little elasticity and lateral rigidity, such as wire ropes, chains or leather bands, great efficiency of operation is attained. Accordingly, the crusher head is, according to the invention, suspended by such means. The rapidly rotating unbalanced body is directly coupled with the driving motor, preferably by way of an elastic coupling, and gearing becomes unnecessary in the arrangement according to the invention, so that frictional losses are limited as far as possible. A high degree of reliability with little risk of breakage occurs in arrangements embodying the invention because, though heavy duties are called for, complete flexibility is provided. By the merely oscillatory (not rotating) motion of the crusher head the danger of smearing or plastering is overcome and, consequently, the crusher may be caused to oscillate at frequencies varying, depending on the material to be crushed, from about some hundreds to about some thousands per minute, so that a considerable increase of the quantity of crushed material is attained as compared with that hitherto attainable. Depending on whether the greatest effect of the crusher is to be produced in the mouth or in the lower part of the apparatus the unbalanced body may be mounted at the upper or lower part of the crusher head; in these cases it is advisable to locate a heavy mass at the part of the crusher head axially remote from the unbalanced body, in order to prevent the remote part of the crusher head from oscillating to a marked extent. Where it is desired to attain the same effect at the mouth and in the lower part of the apparatus, the effect of the unbalanced mass is distributed along the length of the crusher head so that all parts of the crusher head make circular oscillations about its longitudinal axis.

Figs. 1 to 3 of the accompanying drawings diagrammatically illustrate the invention by way of example, each of the Figs. being a vertical section.

Fig. 1 illustrates a crusher producing its greatest effect at the mouth of the apparatus;

Fig. 2 illustrates a crusher producing its greatest effect in the annular opening at the lower part of the apparatus, and

Fig. 3 illustrates a crusher producing substantially equal effects at the mouth and at the outlet.

The crusher illustrated in Fig. 1 where the greatest effect is produced at the mouth mainly comprises a crusher head *a* suspended somewhat like a pendulum in the interior of the crusher bowl *f* by slightly elastic or non-elastic means *b*, having little lateral rigidity for example wire ropes, chains or leather bands. The unbalanced eccentric body *c* which is mounted in the upper part of the crusher is coupled by means of an intermediate shaft *d* with the driving motor *e* mounted in the bottom part of the crusher. This bottom part of the crusher is heavily formed to provide a heavy mass *g* in order that when the rapidly rotating unbalanced mass *c* is driven the upper part of the crusher is caused to oscillate much more vigorously than the bottom part which may not oscillate at all.

The crusher illustrated in Fig. 2 which produces its greatest effect at the annular opening at the lower part of the apparatus mainly comprises the crusher head *a* which, in the interior of the crusher bowl *f*, is suspended somewhat like a pendulum on slightly elastic or non-elastic means *b*. The unbalanced body *c* is mounted in the bottom part of he crusher head *a* and the heavy mass *g* is located at the upper part of the crusher head; this unbalanced body *c* is coupled with the driving motor *e* by an intermediate shaft *d* and an interposed

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ball and socket joint *i*. On driving when the unbalanced body *c* is rotated it causes the lower part of the crusher head to oscillate vigorously, the amplitude of the oscillation decreasing towards the upper part by reason of the effect of the heavy mass *g*.

Fig. 3 is a cross-section of a device having a substantially equal effect at the mouth and at the outlet. Here also the crusher head *a* is suspended in the interior of the crusher bowl *f* on slightly elastic or non-elastic means *b*. Unbalanced bodies *c* are arranged and situated along the length of the crusher head and are coupled with the driving motor *e* by means of an elastic coupling *h*. The action of the bodies *c* in this case is distributed along the entire longitudinal axis of the crusher head *a*. When the unbalanced bodies are driven a vigorous circular oscillation of all parts of the crusher head *a* takes place about its longitudinal axis so that the same effect is produced at the mouth and at the opening at the bottom of the apparatus.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:

1. A gyratory crusher having a freely swinging crusher head, arranged to oscillate under the influence of a rotating eccentric unbalanced mass, which is pendulously suspended on flexible members which have little elasticity, for example wire ropes or leather bands.

2. A gyratory crusher as claimed in Claim 1 in which a heavy mass is concentrated at that part of the crusher head displaced from the eccentric unbalanced mass so as to limit the oscillating movement of the crusher where the heavy mass is located.

3. A gyratory crusher as claimed in Claim 1 in which the distribution of the total mass of the crusher head is so arranged along the head that all parts thereof perform circular or approximately circular oscillations about its longitudinal axis under the influence of the unbalanced and rotating eccentric body.

4. A gyratory crusher, constructed and adapted to operate substantially as described with reference to any one of the accompanying drawings.

Dated this 5th day of October, 1936.

ABEL & IMRAY,
30, Southampton Buildings,
London, W.C.2,
Agents for the Applicants.

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Fig. 1

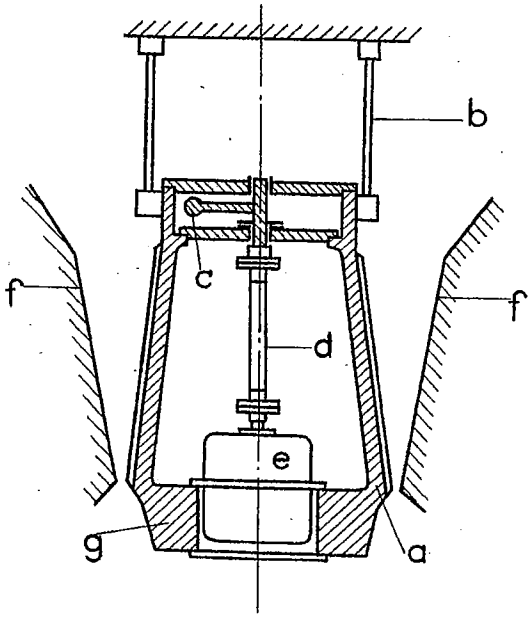



Fig. 2

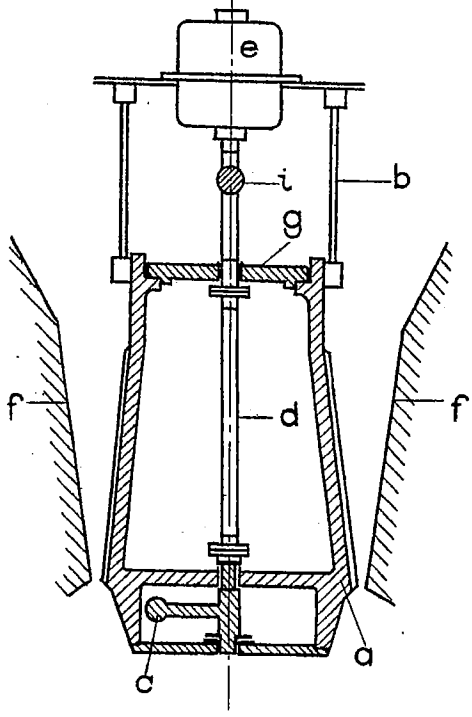
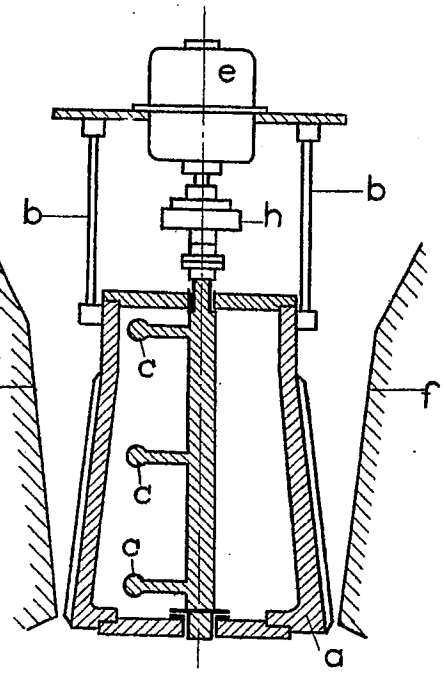



Fig. 3

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